One Health Training and Leadership:

A Community-Based Health Education Program at the Human-Animal Interface

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The health of a rural community may depend upon the recognition by animal owners that what they do or fail to do may not only affect the welfare of their animals but may influence the health of people

One Health

People who protect human, animal, and environmental health, and other partners

Coordinating

Communicating

Collaborating

To achieve the best health outcomes for people, animals, plants, and our environment

Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

CS292933-A

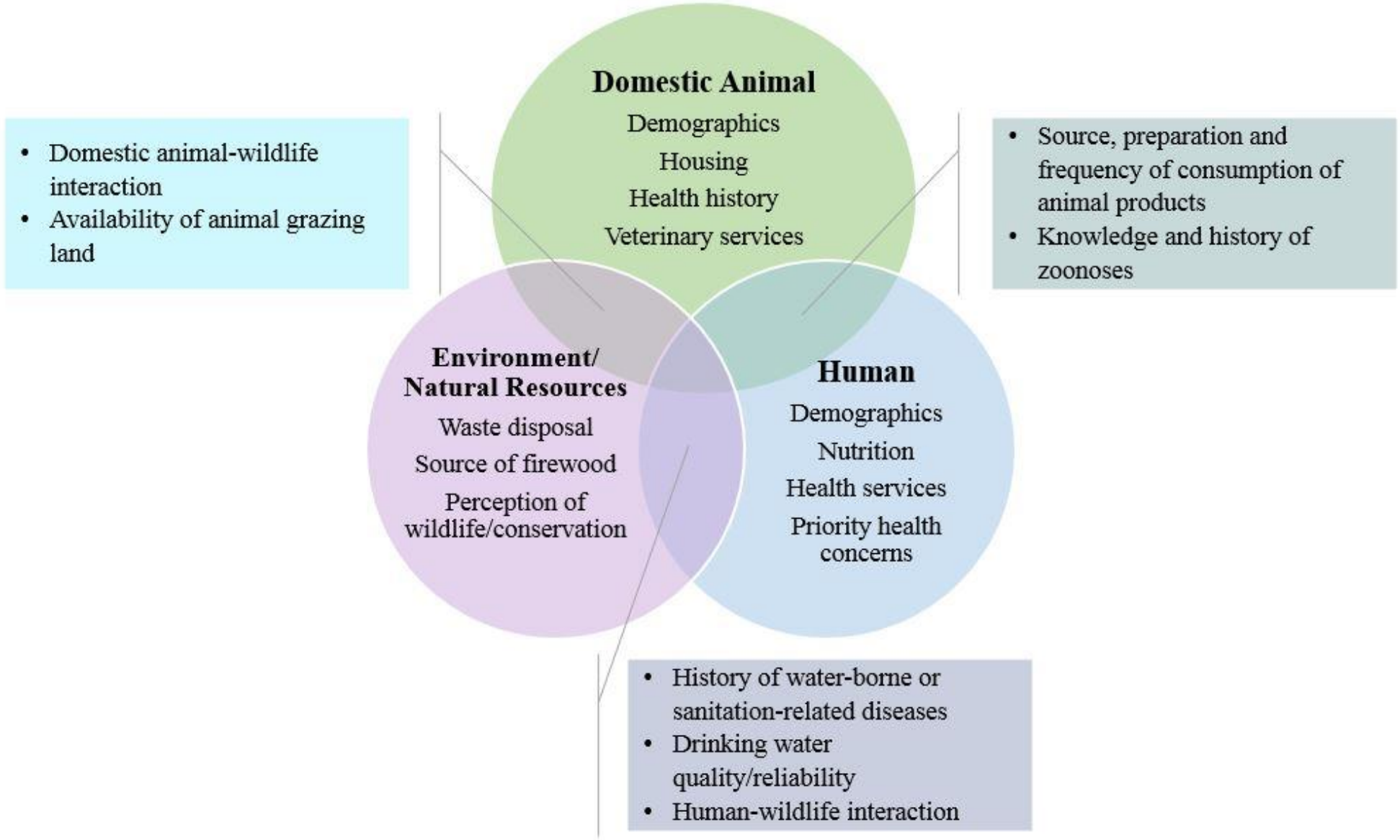

healthy animals
swifuwo leswihanyeke
healthy people
vanhu lvahanyeke
healthy environment
matshamelo lamanene ya rihanyu


South Africa
National Capital
Province Capital
City or Town
International Boundary
Province Boundary*
Road
River
*Province boundaries are subject to change under provisions of the South African Constitution.
0 100 200 300 KM
0 100 200 300 Miles
©2007 Geology.com
Maun
Bulawayo
Masvingo
Plumtree
ZIMBABWE
Francistown
Rutenga
Rio Save
BOTSWANA
Selebi Pikwe
Beitbridge
Chicualacuala
Messina
Mahalapye
Limpopo
MOZAMBIQUE
LIMPOPO
Polokwane
Gaborone
Nylstroom
Xai-Xai
Mariental
Lobatse
MPUMALANGA
Rustenburg
Pretoria
Nelspruit
Mafikeng
Witbank
Mbabane
Maputo
NAMIBIA
Johannesburg
GAUTENG
Bethanien
Keetmanshoop
Seeheim
SWAZILAND
Vaal
Kroonstad
Golela
KWAZULU-NATAL
FREE STATE
Bethlehem
Ulundi
Karasburg
Ladysmith
Tugela
Richards Bay
Bloemfontein
Maseru
LESOTHO
Port Nolloth
SOUTH AFRICA
Mafeteng
Pietermaritzburg
Durban
NORTHERN CAPE
De Aar
Kokstad
Orange
Port Shepstone
Calvinia
Middelburg
Umtata
Vanrhynsdorp
Queenstown
South Atlantic Ocean
Beaufort West
EASTERN CAPE
Bisho
East London
Indian Ocean
Saldanha
WESTERN CAPE
Worcester
Cape Town
Port Elizabeth
Swellendam
Mosselbaai
Cape of Good Hope
Cape Agulhas

Awareness of partner needs…

Mnisi Community, South Africa

Engagement in Research



Berrian et al., *Preventive Veterinary Medicine*, 2016

Mnisi Community, South Africa

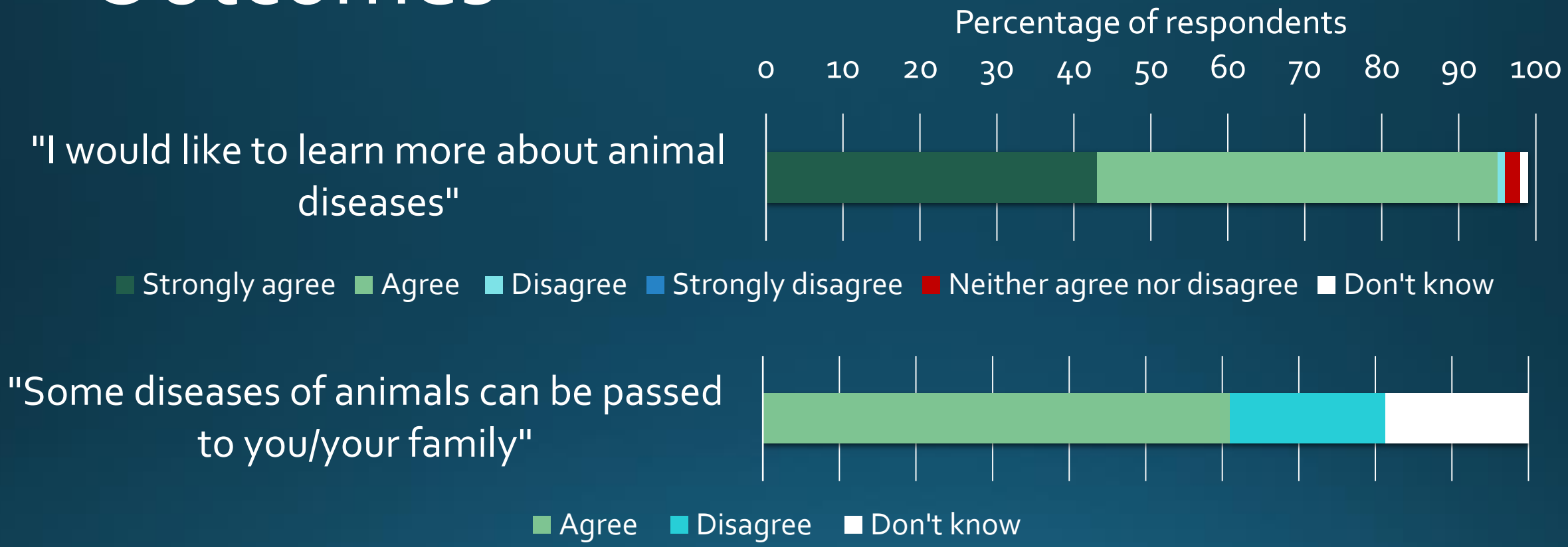
Table 3
Priority health problems in children and adults in the Mnisi study area, Mpumalanga Province, Republic of South Africa as identified by survey participants ($n = 262$).

Children (n)	Adults (n)
Flu[a] (215)	Flu (93)
Diarrhea (82)	Hypertension (69)
Chickenpox (35)	Back/joint pain (68)
Itchy scalp (19)	HIV (62)
Vomiting (11)	Headaches (51)
Fever (11)	Diabetes (49)
Wounds (9)	Tuberculosis (43)
Respiratory (coughing, asthma) (8)	Diarrhea (17)
Headaches (7)	Cancer (13)

[a] Participants used "flu" to describe an illness with coughing, sneezing, runny nose, fever, and/or chills. Etiology was not confirmed.

Berrian et al., *Preventive Veterinary Medicine*, 2016

Outcomes



Berrian et al., *Preventive Veterinary Medicine*, 2016

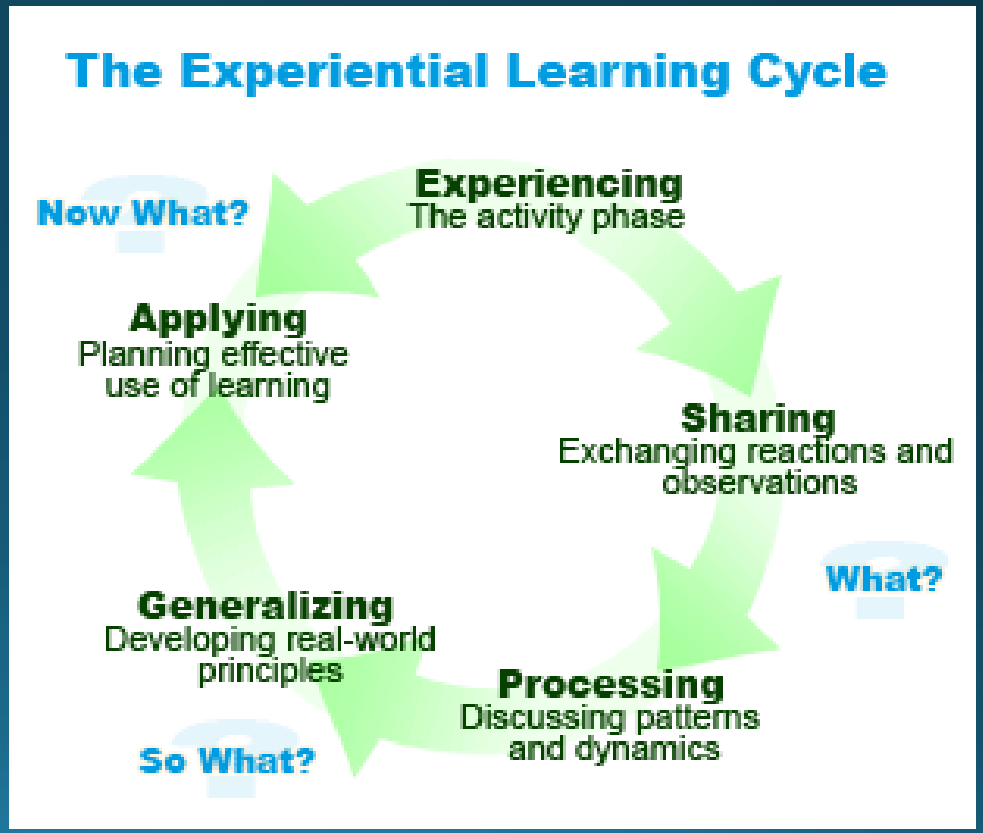
Next Steps: Community-Based Action

Provide	recommendations for mitigation of zoonotic disease risk
Determine	impact of community-based action

Program Development

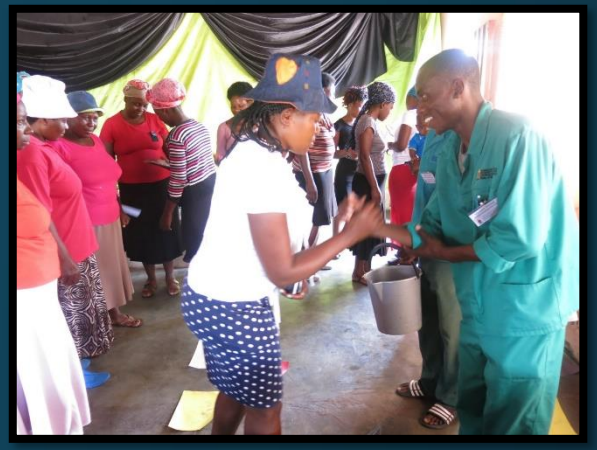
- Professional development
  - Pedagogy
  - Leadership

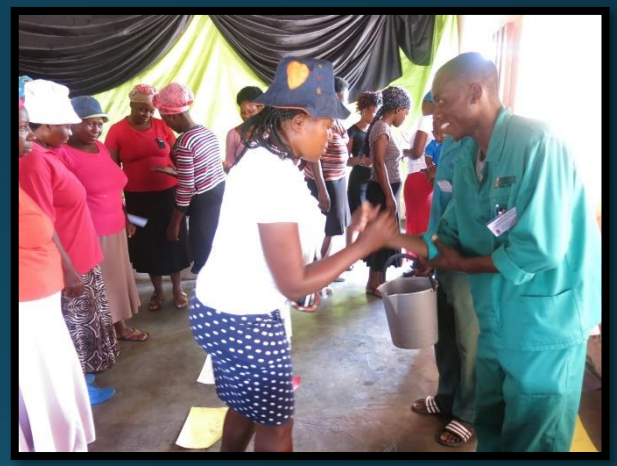
- Curriculum development
  - Guided inquiry
  - Experiential learning

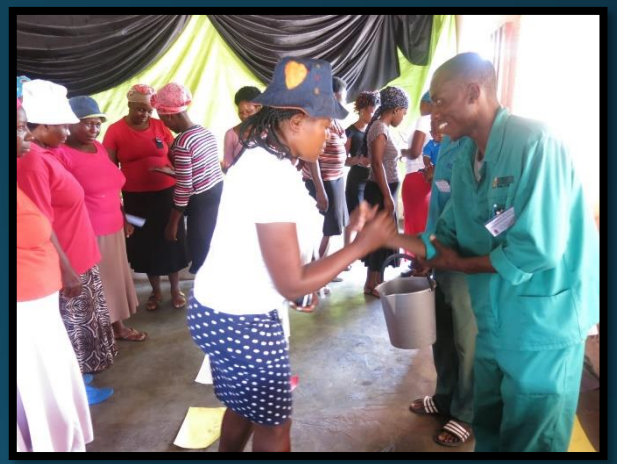


Credit: Kolb, David. Experiential Learning Cycle chart

Experiential Learning







Risk factors	Low Risk	✓	Moderate Risk	✓	High Risk	✓
ANIMAL (DOMESTIC)						
Animal ownership	0-1 species		2 species		More than 2 species	
Animal contact with domestic species outside home environment	Never/seldom		Occasionally		Frequently	
Animal contact with wild animals	Never/seldom		Occasionally		Frequently	
Vaccinations	All recommended vaccinations		Some recommended vaccinations		No recommended vaccinations	
Vaccination status	All current		Some current		None	
Cattle dipping	Frequently		Occasionally		Never/seldom	
Housing	Animals confined individually or in single species groups		Animals allowed to free range occasionally and otherwise confined in single or multi-species groups		Animals are always able to free range	
History of illness	No illness of any kind among animals		Few or minor illnesses		Frequent or severe (e.g., death) illnesses	
Isolation of newly introduced animals	Always		Occasionally		Never/seldom	
Isolation of ill animals	Always		Occasionally		Never/seldom	
HUMAN						
History of flea/tick bites	None		Some		Many	
Consume fresh (unboiled) milk from cattle/goats	Never		Occasionally		Frequently	

Nkunguhato wo hunguta vunghozi

Nomboro ya vutitivisi ya mungheneleri: 9 38

Vekela xifaniso laha

Nkunguhato wo hunguta vunghozi

Vunhu: hinga yihlantswa lolco hilava liu swi suvela

Swiharhi: hinga swiptalela kuri swinga dyiwi

Mbango: Swinga vabyisa vanha lava swidyalta

Mpimo wa vuvekisi (mali, nkarhi, swilaveko): Swinga lava mali yo tala, liu swi endela vuhlayiseki

Mbuyelo/ntlhontlho: ndri nga xavisa maxsa yleswaka ndri ta kuma, mali yo tihanyiso.

Vekela xifaniso laha

Nkunguhato wo hunguta vunghozi

Vunhu: hinga mahlantswa loko hilava kuma tihisa.

Swiharhi: Swinga va dyisa swiharhi swa hinga.

Mbango: Swinga hivangela tirowa setihi vangela vuvabyi

Mpimo wa vuvekisi (mali, nkarhi, swilaveko): swinge lavi mali

Mbuyelo/ntlhontlho: Hinga hlayisa mati, miakarhi yo tala

Vekela xifaniso laha

Nkunguhato wo hunguta vunghozi

Vunhu: A swinge vangi nghozi hikuva swi ptale ri wife

Swiharhi: Swinga hlangani ka swinga ri

Mbango: Swinga vanga vanga mavabyi

Mpimo wa vuvekisi (mali, nkarhi, swilaveko): Swinga lava mali yo swi xuvetk na swakudya

Mbuyelo/ntlhontlho: hinga xavisa hi kuma mali

Program Evaluation

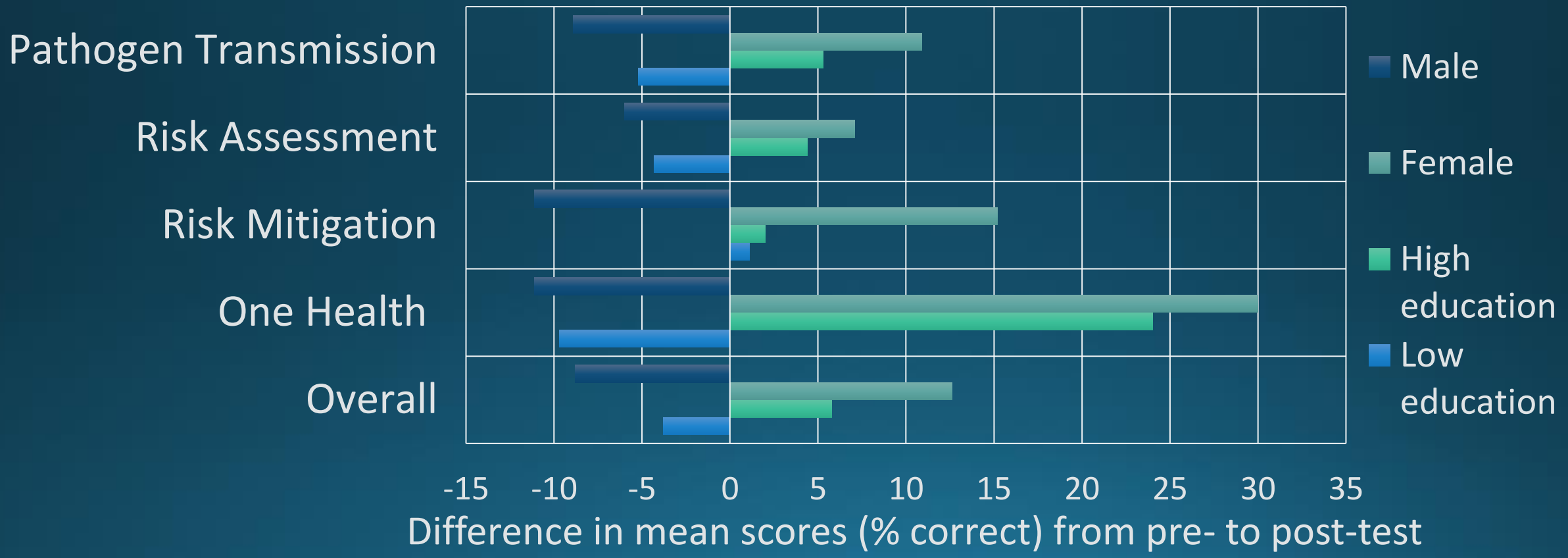


Table 4.2. Change in knowledge – Independent predictors, beta coefficients, odds ratios (OR) and 95% confidence intervals (CI) obtained for univariable and multivariable logistic regression model of improvement in knowledge (yes/no) of *One Health Training and Leadership* participants (n = 69) using an objective pre-/post-test.

Predictors (n)	β	Univariable OR	95% CI	p[a]	β	Multivariable OR	95% CI	p
X_1. Gender coded as 1—female (33), 0—male (36)	1.7884	5.980	2.112-16.931	0.0008	1.9900	7.315	2.258-23.705	0.0009
X_2. Education level coded as 1—high (38), 0—low (31)	0.9163	2.5	0.940-6.646	0.0663	1.5647	4.781	0.942-24.264	0.0590
X_3. Age[b] (continuous)	-0.0123	0.988	0.961-1.016	0.3834	0.0371	1.038	0.989-1.089	0.1288
Fit statistics for multivariable model								
AUC (ROC)						0.796		
AIC						84.535		

[a] Wald test

[b] Variable X_3 was tested both as a continuous and binomial (1=value ≥ median; 0=value < median) variables to determine the best model fit

Model fit statistics: AUC=area under curve; ROC=receiver operating characteristic; AIC=Akaike information criterion

Berrian et al., *One Health*, 2018

Standing water (vector)
External hygiene (vermin, indirect)
Garbage (vector, indirect)

Human

Person-to-person contact (direct/indirect)

Person-to-animal contact (direct/indirect, vector)

Environment

Litter/sanitation

Surface water (vector, indirect)

Animal

Animal-to-animal contact (direct/indirect)

External hygiene/housing (vermin, airborne, vector)
Standing water (vector, injury)
Garbage (intoxication, injury)

Program Evaluation

- Workshop Participants:
  - **98%** (60/61) had implemented ≥1 risk mitigation strategy
  - **95%** (58/61) had shared knowledge with family members, neighbors

Berrian et al., *One Health*, 2018

Covering handle of water tap to minimize contamination

Building a fence around garden to protect crops from wildlife/livestock

Reducing standing water to mitigate risk of vector-borne diseases

Building coops/pens for poultry/livestock to reduce animal-animal disease transmission

Adding handwashing basins near toilets to minimize human pathogen spread

Conclusions

- Evidence of positive program impact
- One Health operationalization at the community level
- Gender analysis and implications